

### REMARKS

In the Office Action dated January 10, 2005, claims 18 and 22 were rejected under 35 U.S.C. § 101 as directed to non-statutory subject matter; and claims 1, 18, 22, 36, 39, and 40 were rejected under § 112, ¶ 2.

Claim 18 has been cancelled, without prejudice, to render the rejection of the claim moot. It is respectfully submitted that claim 22 recites statutory subject matter. Note that claim 22 recites the following steps: introducing a multi-assignment to the code sequence generator, producing, by the code sequence generator based on the multi-assignment, a number of possible plans for creating the near-optimal code sequence, and performing, by the code sequence generator, planning with a satisfiability search to select an optimal plan from among the possible plans.

The Office Action stated that this claim “amounts to an abstract idea failing to suggest an application with a tangible embodiment leading to a concrete and tangible result[, and thus] the claim fails to fulfill the requirements of the practical application test and is rejected for leading to a non-statutory subject matter. 1/10/2005 Office Action at 2.

Applicant respectfully disagrees. As explained by *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1373, 47 U.S.P.Q.2d 1596 (Fed. Cir. 1998),

Unpatentable mathematical algorithms are identifiable by showing they are merely abstract ideas constituting *disembodied* concepts or truths that are not “useful.” From a practical standpoint, this means that to be patentable an algorithm must be applied in a “useful” way. (emphasis added).

The court further held that “the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces ‘a useful, concrete and tangible result’--a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.” *Id.* Similarly, in *AT&T Corp. v. Excel Communications Inc.*, 172 F.3d 1352, 50 U.S.P.Q.2d 1447 (Fed. Cir. 1999), the court held that a method claim relating to using a Boolean algorithm to determine the value of a PIC indicator is directed to statutory subject matter, because the PIC indicator represents information about a call recipient's PIC, which the court said was a useful, non-abstract result. 172 F.3d at 1358.

In claim 22 of the present application, the method of claim 22 uses a code sequence generator to select a plan for producing *a near-optimal code sequence for execution on a computer*. Clearly, the producing of the near-optimal code sequence for execution on a computer is a useful, non-abstract result that clearly satisfies the statutory subject matter requirement. Put another way, the near-optimal code sequence for execution on a computer produced by the method of claim 22 *cannot* be considered just merely an abstract idea constituting *disembodied* concepts or truths that are not "useful." Therefore, claim 22 recites statutory subject matter under § 101. In view of the foregoing, it is respectfully requested that the § 101 rejection be withdrawn.

It is also respectfully submitted that newly added claim 44 is also directed to statutory subject matter, since the method comprises steps performed by a computer-executable code sequence generator.

Claim 1 was rejected under § 112, ¶ 1, for being unclear. The first part of the rejection stated that the term "repeatedly invoking" is not clear. Applicant has clarified claim 1 by indicating that the automatic theorem prover is repeatedly invoked for plural cycle budgets. When read in the context of the remaining part of claim 1, it is clear that the repeated invoking of the automatic theorem prover for plural cycle budgets allows the determination of a minimum cycle budget that is the lowest of any cycle budget K.

The other part of the rejection of claim 1 is that "it is not clear how the code was made near-optimal or how to determine that the code is near-optimal." Applicant respectfully submits that this part of the claim is clear, as the claim explicitly states that the near-optimal code sequence is extracted from a counterexample implicit in the failed proof of the formalized mathematical conjecture for the minimum cycle budget. As recited in the claim, the failed proof refers to failure of the proof that no code sequence for the target computer architecture executes the program fragment within the cycle budget K. The failure of the proof of the formalized mathematical conjecture recited in claim 1 is what provides the determination of the near-optimal code sequence.

Claim 22 was also rejected because the "repeated" language was not clear. Applicant has deleted the term "repeatedly" from line 3 of claim 22, and has added the following clause:

wherein performing the planning with the satisfiability search is repeated a plurality of times for plural machine cycle budgets to find the optimal plan associated with a predetermined machine cycle budget.

This clause clarifies that the planning with satisfiability search is performed a plurality of times for plural machine cycle budgets. Also, the term “matching” has been deleted to render the rejection of that term in claim 22 moot.

With respect to the rejection of claim 22 that it is not clear how the code is “made near-optimal or how to determine when the code is near-optimal,” Applicant notes that the claim expressly states that planning with a satisfiability search is performed to select an optimal plan from among possible plans *for automatically producing the near-optimal code sequence*. Moreover, claim 22 defines that the optimal plan is associated with a predetermined machine cycle budget. Thus, from this, it is clear how the near-optimal code sequence is determined.

With respect to claims 36, 39, and 40, the Office Action stated that it is unclear “what specifically is being input ... or where the input comes from.” Applicant respectfully submits that there is no requirement that the source of the input has to be specified in the claim. It is clear from claim 36 that the input is part of the code sequence generation tool, and such input is capable of receiving a multi-assignment.

With respect to the statement in the Office Action that “it is not clear what is matched in order to produce the possible plans,” Applicant has added language stating that the matcher is responsive to the multi-assignment and produces, *by a matching of the multi-assignment and facts regarding operators computable in a computer*, a number of possible plans for creating the near-optimal code sequence. This amended language addresses the lack of clarity rejection regarding the “matcher” element.

The Office Action further stated that it is “unclear how invoking the matcher and a planner adds up to (‘thereby’) implementing an automatic theorem-prover for automatically generating near-optimal code.” Applicant has added language that states that the optimal plan selected by the planner corresponds to the near-optimal code sequence – therefore, it is respectfully submitted that this last part of the rejection of claim 36 has also been addressed.

Amended claim 39 is similarly allowable.

Claim 40 has been cancelled to render the rejection of the claim moot.

In view of the above, it is respectfully submitted that the § 112 rejections have been overcome.

Newly added claims 41-47 are also allowable.

All claims are condition for allowance, which action is respectfully requested. The Commissioner is authorized to charge any additional fees and/or credit any overpayment to Deposit Account No. 08-2025 (200302030-2).

Respectfully submitted,

Date: \_\_\_\_\_

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